OPEN ACCESS Freely available online

ISSN: 2155-9589
Journal of Membrane Science & Technology

Opinion Article

Chemical Composition of Synthetic Membrane Devices

Manuel Javier*

Department of Health Sciences, University of University of Science and Technology, Shanghai, China

DESCRIPTION

Artificial or synthetic membranes are usually synthetically manufactured membranes intended for laboratory or industrial separation. Synthetic membranes have been successfully used in small and large industrial processes since the mid-20th century. Various synthetic membranes are known. They can be made from organic and inorganic materials such as polymers and liquids. The most commercially used synthetic membranes in the separation industry are made of polymer structures. They can be categorized based on their surface chemistry, bulk structure, morphology, and manufacturing method. The chemical and physical properties of the particles separated from the synthetic membrane, as well as the choice of driving force, define a particular membrane separation process.

The driving force of the most commonly used membrane process in the industry is the gradient of pressure and concentration. Therefore, the corresponding membrane process is called filtration. Synthetic membranes used in the separation process can have different shapes and corresponding flow configurations. They can also be categorized based on their application and separation regime. The most common synthetic membrane separation processes include water purification, reverse osmosis, dehydrogenation of natural gas, and removal of cell particles by microfiltration and ultrafiltration, removal of microorganisms from dairy products, and dialysis.

Synthetic membranes are used in a variety of separation processes such as dialysis, electro dialysis, and hemodialysis, and hemofiltration, ultrafiltration and over filtration, evaporation, and the most common ones are listed. This process is commonly named after a driving force such as concentration. Synthetic membranes made from a variety of polymers are used in processes such as microfiltration, ultrafiltration, reverse osmosis, electro dialysis, and gas separation. This article describes different membrane structures, their functions, and their applications in different separation processes.

Synthetic membranes can be made from many different materials. It can be made from organic or inorganic materials, including solids such as metals and ceramics, homogeneous films (polymers), inhomogeneous solids (polymer blends, mixed glass), and liquids. Ceramic diaphragms are made of inorganic materials such as alumina, silicon carbide, and zirconia. Ceramic membranes are extremely resistant to the effects of aggressive media (acids, strong solvents). They are chemically, thermally, and mechanically very stable and biologically inert. Ceramic membranes are heavy and expensive to manufacture, but they are environmentally friendly and have a long life. Ceramic membranes are commonly manufactured as monolithic foam tubular capillaries.

Synthetic membranes are used in a variety of separation processes such as dialysis, electro dialysis, hemodialysis, hemofiltration, ultrafiltration, over filtration, and evaporation, to name a few. This process is generally categorized according to the applied driving force, such as concentration, potential, or pressure difference of the entire membrane. The more common requirements for membranes used in the separation process are high flux, good selective permeability, chemical and possibly heat resistance, and high durability (long service life) application.

One of the important properties of synthetic membranes is their chemical properties. Synthetic membrane chemistry usually refers to the chemistry and composition of the surface that comes into contact with the separation process stream. The chemistry of the membrane surface can differ significantly from its bulk composition. This difference may be due to the distribution of the material at some stage of membrane production, or the deliberate change of the surface after formation. The surface chemistry of the membrane is hydrophilic or hydrophobic (in terms of surface free energy), the presence of ionic charges, the chemical or thermal stability of the membrane, the binding affinity for particles in solution, and biocompatibility (biochemistry) in the case of separation.

Correspondence to: Manuel Javier, Department of Health Sciences, University of University of Science and Technology, Shanghai, China, Email: Manuel@gmail.com

Received: 02-Mar-2022, Manuscript No. JMST-22-16320; **Editor assigned:** 07-Mar-2022, Pre QC No. JMST-22-16320 (PQ); **Reviewed:** 21-Mar-2022, QC No. JMST-22-16320; **Revised:** 28-Mar-2022, Manuscript No. JMST-22-16320 (R); **Published:** 07-Apr-2022, DOI: 10.35248/2155-9589.22.12.272.

Citation: Javier M (2022) Chemical Composition of Synthetic Membrane Devices. J Membr Sci Techno. 12:272.